

WHAT IS CLAIMED IS:

- 1 1. An optical coupler comprising:
 - 2 a housing with a rotatable distal face and a stationary proximal face, the distal face having an eccentric port and a central port
 - 4 a lens disposed inside the housing to intercept a rotating collection beam emerging from the eccentric port and to re-direct the collection beam to a focus proximal to the lens as the collection beam rotates; and
 - 8 a beam re-director disposed between the lens and the distal face, the beam re-director being oriented to direct a delivery beam toward the central port.
- 11 2. The optical coupler of claim 1, further comprising a light source disposed to direct a delivery beam radially inward to the beam re-director.
- 13 3. The optical coupler of claim 1, wherein the beam re-director comprises a penta-prism.
- 15 4. The optical coupler of claim 1, wherein the beam re-director comprises a prism.
- 17 5. The optical coupler of claim 1, wherein the beam re-director comprises a mirror.
- 19 6. The optical coupler of claim 1, further comprising a detector disposed at the focus for receiving the rotating collection beam.
- 21 7. The optical coupler of claim 1, wherein the lens is configured to focus the collection beam on an axis of rotation of the distal face.
- 23 8. The optical coupler of claim 1, wherein the lens is configured to focus the collection beam off an axis of rotation of the distal face.
- 25 9. The optical coupler of claim 1, wherein the lens comprises an axicon lens.

26 **10.** A system for identifying vulnerable plaque, the system comprising:

27 a rotating catheter having a collection fiber and a delivery fiber
28 extending therethrough;

29 a housing with a rotatable distal face and a stationary proximal
30 face, the distal face having an eccentric port and a central port

31 a lens disposed inside the housing to intercept a rotating collection
32 beam emerging from the eccentric port and to re-direct the
33 collection beam to a focus proximal to the lens as the collection
34 beam rotates; and

35 a beam re-director disposed between the lens and the distal face,
36 the beam re-director being oriented to direct a delivery beam
37 toward the central port.

38 **11.** The system of claim 10, further comprising a light source disposed to direct a
39 delivery beam radially inward to the beam re-director.

40 **12.** The system of claim 10, wherein the beam re-director comprises a penta-
41 prism.

42 **13.** The system of claim 10, wherein the beam re-director comprises a prism.

43 **14.** The system of claim 10, wherein the beam re-director comprises a mirror.

44 **15.** The system of claim 10, further comprising a detector disposed at the focus
45 for receiving the rotating collection beam.

46 **16.** The system of claim 10, wherein the lens comprises an axicon lens.